

THE M. C. DANIEL CO., BOSTON, MASS.

CATALOGUE AND PRICE-LIST.

Pipedored Specialties for Steam Users.



M. C. DANIEL'S EXHAUST PIPE HEAD.

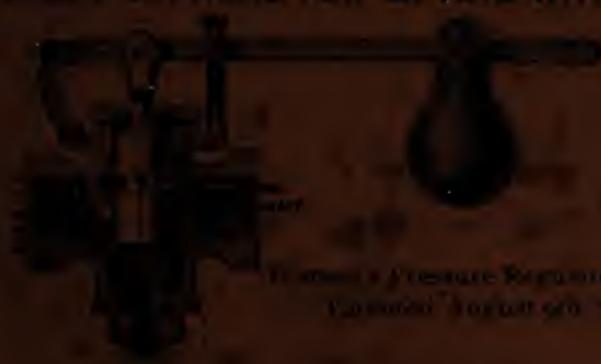
CHARLES' STEAM TRAP.

M. C. DANIEL'S SPECIAL STEAM TRAP.

WATSON'S PRESSURE REGULATOR.

M. C. DANIEL'S SUCTION FITTING & TEE.

M. C. DANIEL'S SYPHONS FOR LIFTING WATER, &c.



Watson's Pressure Regulator.

Watson's Suction & Tee.

WATSON'S PRESSURE REGULATOR.

Before Ordering a Steam Trap

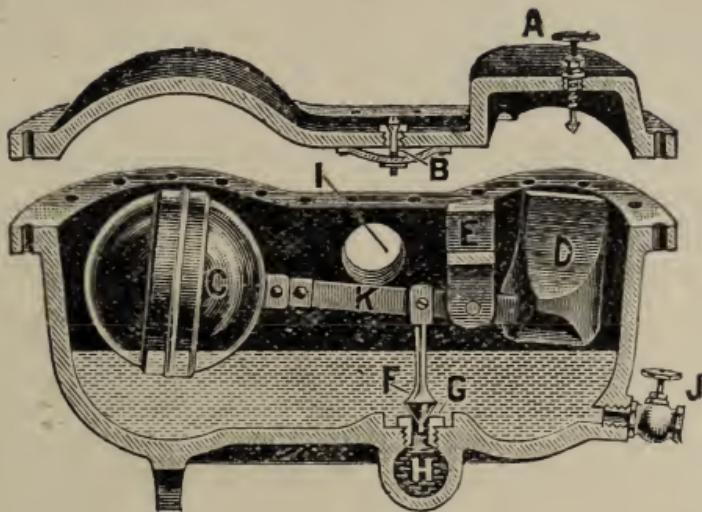
Read Pages 8, 9 and 10.

For Extra High Pressure above 125 lbs.,

see Page 16.

We know that the McDaniel Special Steam Trap is the Best and Cheapest Steam Trap in the World, because it has the largest Valve Outlet in the Bottom, this is the ONLY WAY to JUDGE the POWER of a TRAP for DRAINAGE by COMPARISON of SIZE of VALVE OUTLET. It is so large that it is almost impossible to overload it. It is the cheapest because it drains more pipe for the same money than any other Trap. Its discharging STEADILY makes it do double the work of a Trap that discharges at intervals and prevents all loss of steam when discharging condensation.

The "McDaniel" Special Steam Trap.



PATENTED AUG. 19TH, 1890.

A NEW STEAM TRAP.

Adapted to use in Sugar Refineries, Breweries
Distilleries, Paper Mills, Canneries,
Heating Apparatus, etc.

In offering this Steam Trap to Contractors, Steam Fitters and owners of buildings, we are confident that we are giving them all that is required, as it is a continuous drainer, does not discharge at intervals, or throw out any steam with the condensation, and it gives more drainage for the amount it is sold at than any other Trap on the market, and we know, after many years of experience, that it is the cheapest, the most reliable and perfect working Trap ever made, and it is sold guaranteeing the above results. It is good for either high or low pressure.

McDANIEL'S TRAPS

All Traps work perfectly at from 100 pounds steam pressure to one pound at the Trap, and we make them for any higher pressure required if notified what the pressure required is when ordering.

Read pages 8, 9 and 10 in this catalogue about pressures carefully before ordering any of the Traps of our make.

The McDaniel Special Steam Trap is well adapted to use in all places where there is a large flow of condensation when steam is first turned on, as it is adapted to either a large or small flow of water, likewise to high or low pressure, this is the case in no other Steam Trap as the Water Outlet of this Trap is more than four times as great as any other Trap in use, as can be seen by referring to our list of sizes and capacities. It will be seen at once that it fills a want long required where Pans, Stills or Kettles are used. As the first flow of water passes off and allows the Coils or Pans to get hot at once, and then adjusts itself to the small flow of water that follows without loss of steam. We use a special make of Copper Float, which is neither Braized or Soldered, leaving the copper in its original state, so as not to sweat or leak under any circumstances, and making any outside Air Communications to the Float unnecessary.

The Counter balance is inside of the Trap and entirely above water, which gives the trap its great lifting power so that almost any size Valve can be used at the bottom or Water Outlet, and giving Instantaneous relief to the Coils or Kettles as soon as Steam is turned on, and preventing any flooding of them in case of sudden cooling off or water flooding from the Boilers.

We also use a Plug Valve in the bottom of the Trap, it cannot leak or stick and allows any grease or sediment to pass off, at once without Clogging.

It is the most simple and effective and durable Steam Trap in the market, and all the Coils from a set of Pans or Stills can be drained into one Trap.

It is sold guaranteeing the above results.

SIZES AND CAPACITY.

No. 1.	Inlet and Outlet.	1 inch standard gas thread.	
No. 2.	"	$1\frac{1}{4}$ inch standard gas thread.	Drains 3500 feet of 1 in. Pipe.
No. 3.	"	$1\frac{1}{2}$ inch standard gas thread.	Drains 7000 feet of 1 in. Pipe.
No. 4.	"	2 inch standard gas thread.	Drains 14000 feet of 1 in. Pipe.
No. 5.	"	$2\frac{1}{2}$ inch standard gas thread.	Drains 20000 feet of 1 in. Pipe.
			Drains 25000 feet of 1 in. Pipe

PRICES.

No. 1.	.....	\$30.00
No. 2.	.....	40.00
No. 3.	.....	65 00
No. 4.	.....	75.00
No. 5.	.....	100,00

where the Steam pressure on the Trap is above 100 lbs, it is best to state so in ordering so that the Valve in the bottom of the Trap can be so adjusted as to make it work freely at the **desired pressure**.

This Steam Trap is the very best in the market for Heating Coils or Radiators, as the Outlet or Bottom Valve in the largest, or No. 5 size, is full $1\frac{1}{4}$ inches diameter, and the Plug Valve (F) is lifted off of its seat, the full area of the hole, when there is a rush of water into the Trap, and when the flow ceases, the Valve adjusts itself to the flow.

All the other sizes are made correspondingly large at the valve outlet and it can be seen that it is **cheaper judged by its discharge capacity** than any other Steam Trap ever before offered, and they work well on a small amount of pipe and all the way up to their full drainage, according to this list.

A large Valve Outlet in a Steam Trap is always desirable, for no matter how small the flow of the water of condensation, the quicker the pipes are relieved of it the better as then they get hot and no water remains in them to condense the steam and a small amount only is used to keep the coils hot.

If a Steam Trap is used with the ordinary small Valve Outlet then when Steam is first turned on, everything becomes flooded and the pipes remain cold, while a large amount of Steam is condensed before the apparatus becomes hot.

We have constructed this new Steam Trap after having many years experience with all the different kinds and know that it is better, and according to its draining capacity, cheaper than any other Steam Trap ever put on the market.

GUARANTEE.

We offer it to the Trade guaranteeing these facts and it can always be had of any one of our Agents throughout the United States and Canada, and tried on its own merits—if it does not prove just as we have stated it can be returned after a trial and no charge will be made,

It is guaranteed to be the most reliable and to drain more Heating Apparatus than any other Steam Trap sold for the same amount of money.

All we ask for it is a trial on the above conditions.

These Steam Traps are also well adapted to use on Exhaust Steam where used for Heating Purposes.

FOR MARINE AND NAVAL USE.

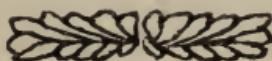
We manufacture the **McDaniel Special Steam Trap**. It is so constructed that the rolling of the vessel has no effect upon it.

Where the Steam Pressure is **above 100 lbs.** at the Trap we manufacture them to suit the order and an **extra charge** will be made on **each Trap**.

We **guarantee** them to work at the desired pressure, and to stand the test named, as the Outlet in the bottom of the Trap is very large, even at the higher pressure. A small Trap can be used to discharge a large amount of water.

These Traps are very desirable for ships use, as they occupy but a small space. **On Steam Jackets** they are **invaluable**, as they readily relieve the **Jackets** of the large flow of condensation that occurs when steam is first turned on, thereby preventing the flooding of the jackets.

The attention of owners and builders of Steamships is called to the above, as we furnish the Trap, guaranteeing the results as stated, or they can be returned to us and no charge will be made.



EXTRA HEAVY No. 5

McDANIEL'S

Special Steam Trap.

It works well and discharges freely at from 1 lb. up to 100 lbs. steam pressure. It will stand a testing pressure of 250 lbs. on the body. The water outlet is unusually large, according to the Pressure it is ordered for. When no particular Pressure is given in the order, we always send what we call our

For Regular Pressure, which means to work from 1 lb. up to 100 lbs.

For Extra High Pressure, we mean for Pressures above 100 lbs. and up to 200 lbs. But always state in ordering what your maximum boiler pressure is, so we can make the valve in the bottom to suit the pressure.

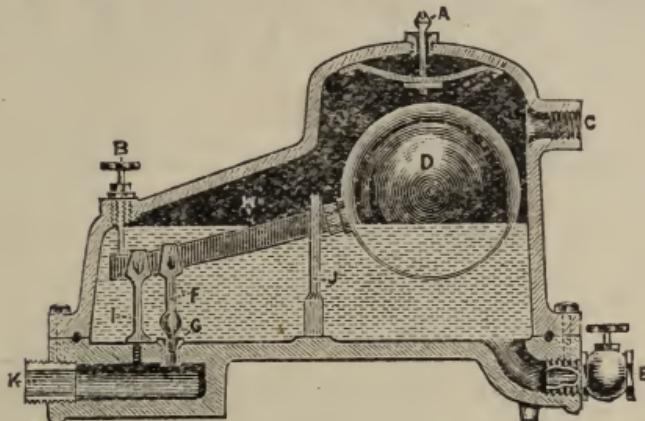
For Low Pressure, we mean for Pressures below 30 lbs., but always state pressure in ordering, so as to get the benefit of a large valve outlet.

PRICE.

No. 5 Extra Heavy McDaniel, \$100. Drains 25,000 ft. of 1 in. pipe. Inlet and Outlet, 2½ inches.

A RELIABLE STEAM TRAP

For small drainage that can be sold at a low price so as to be generally used.



The above cut represents our No. O, and No. OO, McDaniel Special Trap, which fills a demand that has long existed. It discharges **continuously**, does not blow off or waste steam, but works like our other Traps of the larger sizes, and is altogether reliable. The No. O weighs but 35 lbs. while the No. OO weighs but 20 lbs., and occupy but a very small space, and it can be seen at once that they are the traps required for small buildings, or where there is but a small coil or a few Radiators to be drained; they will be sold and guaranteed by any of our Agents in the United States or Canada, and all that we ask for them is for users of traps to give them a trial and we offer them at the following low prices, which is cheaper than any continuous discharging or Floating Trap that has ever been sold.

PRICES.

No. O.....	\$12.00	Drains 1000 ft. of 1 in. pipe
No. OO.....	8.00	Drains 450 ft. of 1 in. pipe.

No. OO Has no wheel valve at B.

CAPACITY.

No. O, Inlet and Outlet, $\frac{3}{4}$ inches.

No. OO, inlet and outlet, $\frac{1}{2}$ inches.

Both sizes work at from 1 lb. to 100 lbs. Steam Pressure.

WE MANUFACTURE

STEAM TRAPS

of all the different kinds shown in
this Catalogue.

For Low Pressure Work.

But as a Low Pressure Trap will not work well on high Pressure, it is not desirable for **dealers** to carry them in stock. They should be ordered as they are needed by the consumer, stating **about** the amount of Pressure carried on the Trap, we will then regulate the **Water** outlet in the bottom of the Trap, so that it will discharge **Freely** at Low Pressure, and clear the Coils or Apparatus of water as soon as Steam is turned on, but it must be understood in ordering a **Low Pressure** Trap, that a Low Pressure Trap will not work on High Pressure, as it will, if an excess of Pressure is turned on, close down and not discharge at all, while a High Pressure Trap will work on either high or Low Pressure, but does not discharge freely on Low Pressure jobs.

The prices are the same for Low and Regular Pressure Traps of the different makes as shown in the Price Lists.

BY REGULAR PRESSURE TRAPS

We mean, that the Chapman Trap, Regular Make, is intended to use on from 75 lbs. to 1 lb. pressure. The McDaniel Special Steam Trap, regular Make at from 100 lbs. to 1 lb. Pressure at Trap. The McDaniel Special Traps, No. O and No. OO, regular make, work at from 100 lbs. Pressure to 1 lb. at Trap.

For Steam Pressure exceeding 125 pounds at the Trap, we recommend the McDaniel Special Steam Trap, as we can use a larger valve or water outlet in the bottom than is possible in any other Trap.

An extra charge will be made for all Traps ordered to work at over 125 lbs. at the Trap.

All the Bodies of our Steam Traps made for Regular Pressure Work as above described will stand a testing Pressure of 150 lbs.

The difference between *Regular Pressure* and Low Pressure Traps being only in the size of the valve at the bottom.

All sizes Regular Pressure McDaniel Steam Traps can be made to work as high as 125 lbs. without extra charge, except No. O and No. OO sizes, which can only be made up to 100 lbs. pressure.

All sizes Regular Pressure Chapman Steam Traps can be made to work as high as 125 without extra charge, except No. 1 size, which can only be made to work up to 75 lbs.

For Extra High Pressure from 125 lbs. up to 200 lbs.
SEE PAGE 16.



△△△ NOTICE △△△

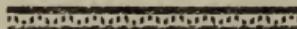
-- TO --

All : Purchasers : of : Chapman

STEAM TRAPS,

WHERE THEY ARE TO BE USED ON

**STEAM PRESSURES OVER 75 POUNDS.
AND NOT HIGHER THEN 125 POUNDS.**



AS IT is really necessary that all Chapman Steam Traps used where the steam pressure is above 75 lbs. at the Trap, should be made for the place and parties using them will find it greatly to their advantage to order them so that the Valve hole or outlet can be made to discharge the condensation steadily. This is the case with all steam traps on the market. If it does not exceed 125 lbs. no additional charge will be made. It can be seen at once that it is to the advantage of the purchaser in all cases to do as we suggest.

Number 1 Chapman Traps are not made over 75 lbs.

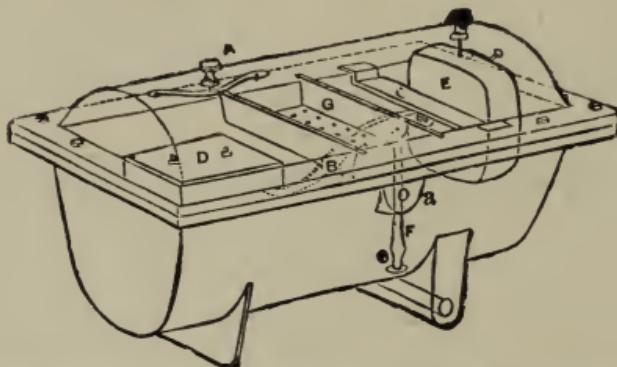
Special Notice to Users of the Chapman Steam Trap.

ALL Steam Traps need a little attention after putting them on ; a Float Trap is always the best. If your Soapstone Float gives out we furnish another as the cost of the stone, which is from 25 cents to \$1.00, according to the size of Trap.

Anyone can put on a new Soapstone by simply balancing the Trap as you would a pair of scales, leaving the Soapstone just heavy enough to close the Valve when the Trap is empty. Our Seats and Stems are all of Phosphor Bronze Metal, and cannot cut out. There is a Plug in the end of each Trap, at which place a pipe should be attached leading to the waste-pipe from the Trap, with a valve between the Trap and the waste-pipe which can be opened at first to get up a quick circulation or clean the trap out, which should be done frequently. Every part of our Traps can be replaced by us, and can be put in the Trap by an engineer; and by a little care, a Trap can be made to last as long as a Boiler or a set of Radiators. Steam users are beginning to learn that Steam Traps are a necessity, and need a little attention as well as other pieces of machinery. They should be opened and looked after at least once in two years. Should your Chapman Trap get out of order, send to us for parts worn out and repair it yourself, or send the Trap to us and we will, at a very small cost, make it as good as any Steam Trap in the market. Never condemn any Steam Trap for not relieving the Heating Apparatus of water that backs up in it, you must first get the water to the Trap before it can discharge it. If the water backs up in your Dry Room or Heating Apparatus, or if you have several connections on the Trap, use Suctions Tee or Fittings and avoid all trouble in that way,

CHAPMAN'S SELF-REGULATING STEAM TRAP.

[PATENTED APRIL 16TH, 1878]



A, Air Valve. **D**, Soapstone Float. **B**, Lever. **E**, Counterpoise Weight. **C**, Saddle, from which the Lever is Suspended, and by lifting it, all working parts come with it. **b**, Pivot Joint. **F**, Valve Stem e, Valve Seat and Outlet, **G**, Screen. **a**, Inlet. **H**, Screw for depressing Lever and Opening Valve.

AN IMPORTANT IMPROVEMENT,

To all who use Steam for Heating, Drying, Boiling,
Dyeing or Sugar Pans, in Oil or Coal Regions
for Pumps or any other Purpose.

In introducing this Steam Trap, we wish to call your attention to the following advantages :

1st. It will save fuel.

2nd. All the working parts are inside the Trap, and

connected, and can be lifted out together upon the removal of the lid, making it very convenient to clean or repair.

3d. The float is made of solid soapstone, and is counterbalanced.

4th. The lever is suspended with firm heavy pivots, so as to work with perfect ease.

5th. A screw passes through the lid for depressing the lever and opening valve, when you desire to drain the Trap, so as to prevent freezing, or to blow out any dirt which may accumulate under the valve.

6th. An air valve in the lid.

7th. There are no stuffing boxes to prevent the free working of the lever and float, which is an important feature.

8th. Both inlet and outlet connections are made below the joint of the lid, so that repairs can readily be made without the labor and time of disconnection.

9th. A Float Trap is acknowledged by all to be the only true principle for a steam trap, as there is always a body of water above the valve, which prevents all danger of blowing steam and does not discharge by blowing, but discharges a steady stream of water as fast as condensed, which can always be saved when you wish to return it to the boilers.

10th. The valves and stems are made of Phosphor Bronze, and cannot be cut out by steam,

SPECIAL NOTICE

TO

COAL OPERATORS

AND ALL

Owners of Deep Mines.

In making an order always state what your highest Boiler Pressure is.

We are now manufacturing a Trap that supplies the demand for a reliable Steam Trap, to carry off the water of condensation that accumulates in the pipes leading to the steam pumps—where the boilers are on top of the ground and the pumps are down in the mines. Knowing that in all such places a very heavy pressure is used, and that all steam traps tried for that purpose heretofore have been failures, and after many years' experience and numerous trials, we have now overcome all those difficulties so well known to all mining engineers, by manufacturing a Trap with extra heavy flanges, which are planed and using only a very thin gasket. It cannot blow out, the flanges being so heavy they cannot spring. Our Float is solid soapstone, and is counterbalanced. Soapstone will stand the operations of steam and mine water for years.

All that we now ask of operators is to send one of these TRAPS ON TRIAL, and let it make its own guarantee. The drip or waste from the Trap can be run into the Sump, which will carry off all the vapor that may arise from the water of condensation, which is so objectionable in a mine. By the use of a Trap, arranged as above, a pump can be run without opening the cylinder cocks, as all water is carried out of the pipes by the Traps, and the pump can at any time be started on dry steam.

Chapman's Self-Regulating Steam Trap.

PRICES AND CAPACITIES.

No. 1, \$25.00, will drain	1,500 feet 1-inch pipe.
" 2, 35.00, "	3,000 " 1 "
" 3, 60.00, "	7,000 " 1 "
" 4, 70.00, "	10,000 " 1 "

The inlet and outlet of the sizes are as follows:

No. 1, inlet and outlet standard gas thread, 1 inch.	
" 2, " " " " " " 1 $\frac{1}{4}$ "	
" 3, " " " " " " 1 $\frac{1}{2}$ "	
" 4, " " " " " " 2 "	

All the above sizes are calculated to work easily at any steam pressure, from 1 to 75 lbs. at the Trap. State in ordering, where pressure is over 75 lbs. and below 125 lbs.

No. 1 size can only be made to work up to 75 lbs.

Nos. 2, 3 and 4 sizes can be made to work up to 125 lbs., but not higher, and must be specially ordered, giving pressure wanted.

Let us know, then we will regulate the valve to suit.

FOR LOW PRESSURE USE.

When Chapman Traps are required for low pressure work, below 30 lbs. state pressure, and we will send a Trap adapted to it that will discharge freely.

Any number of testimonials can be furnished if required, but as all our goods are guaranteed satisfactory, we claim that it is unnecessary. They are well and favorably known all over the United States and Canada.

No extra charge for Low Pressure Traps—They are the same price as the Regular Traps. Always state the pressure in ordering if pressure is below 30 pounds.

EXTRA HIGH PRESSURE STEAM TRAPS.

For Steam Pressures above 125 lbs. and up to 200 lbs., we make only the following sizes and kind from special patterns made extra, and will stand a testing pressure of 250 lbs.

	Price.	Inlet and Outlet.
Chapman Extra Heavy, No. 2,	\$50.00.	1 $\frac{1}{4}$ inches.
" " " No. 3,	80.00.	1 $\frac{1}{2}$ "
McDaniel Extra Heavy, No. 2,	55 00.	1 $\frac{1}{4}$ "
" " " No. 3,	80.00.	1 $\frac{1}{2}$ "
" " " No. 4,	90.co.	2 "
" " " No. 5,	100 00,	2 $\frac{1}{2}$ "

For Drainage see same as Regular Pressure Traps.

When above 125 lbs. always state your highest Boiler Pressure in ordering, so we can know how to make the valve to suit the pressure.

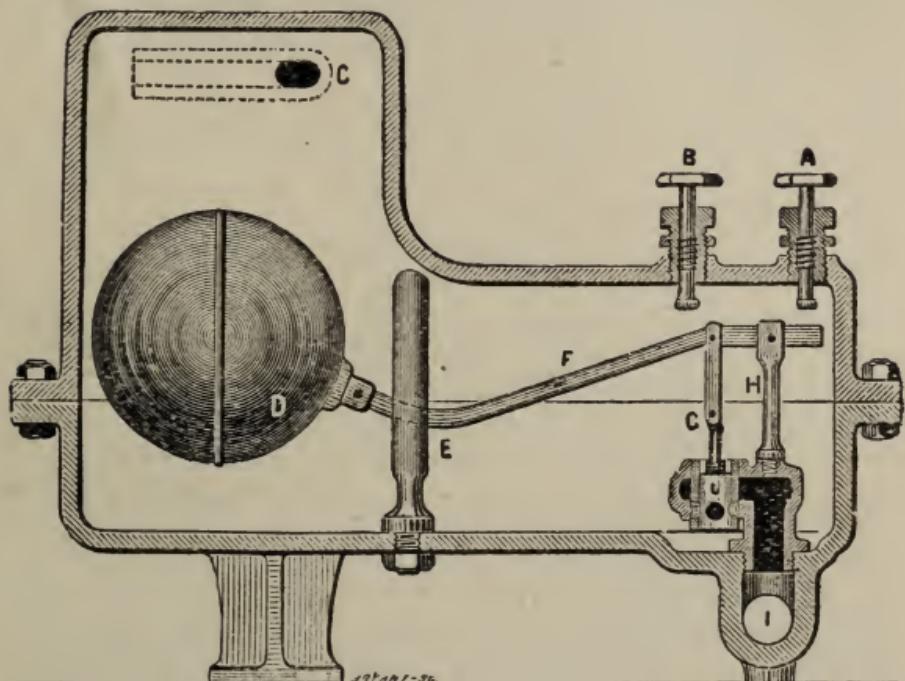
IMPORTANT.

In putting on a Steam Trap for Extra High Pressure it is necessary that you should guard against the Gasket blowing out. We do our part by putting in Extra Bolts, making heavy Flanges and using the best material for the Gasket.

DIRECTIONS.

Put your Trap together before putting it in place, being sure that no dirt is left in it. Draw your bolts as tight as you can without stripping the threads—when steam is turned on, go over them and draw as tight as they will allow, then when cool go over them again, being sure to draw all the bolts evenly and the gasket will never blow out,

BAIRD'S
AUTOMATIC STEAM TRAP.



Patented by Geo. W. Baird, Engineer Corps, U. S. Navy, Aug. 3, 1878
Number 1368,461.

Particularly adapted for Marine and Naval Use,
on Steam Jackets, Evaporators. Steam
Radiators. &c.

BAIRD'S Automatic Steam Trap.

(PARTICULARLY ADAPTED FOR MARINE AND NAVAL USE)

Works on High or Low Pressure.

- C Is the inlet to receive the discharge from the heaters.
- D Is a hollow copper float, made of heavy copper and brazed at the joints, so that it cannot collapse nor leak.
- F Is the lever opening the float.
- G Is the stem connecting the lever with the piston or valve.
- I Is the outlet or discharge.
- H Is the post supporting the lever and float.
- E Is the guide in which the lever works.
- A Is the valve wheel, by which the lever F is raised, and at the same time raising the valve of piston I, so as to open the Trap by hand.
- B Is the valve wheel by which the lever F is lowered, and at the same time closing the valve or piston so as to close the Trap. These two wheels, A and B, are intended only to be used in case the valve J becomes clogged or sticks.

The operation of the Trap is as follows: when the condensation enters the Trap at C, and rises to the floating point on the ball or float, the water lifts the ball and opens the valve J, enough to bring the port holes in it opposite the holes in the cylindrical case in which the valve works and discharges the water at I, which may be discharged to the open air, or to a tank to be pumped back to the boiler.

It can be seen at once that this Trap has a great advantage over all other Steam Traps in use, because:

FIRST. It has a perfectly balanced valve, and operates as freely at one pressure as another, no matter whether high or low.

SECOND. The area of the openings in the piston are equal to the inlet and discharge pipes, which is a

great advantage, as the Trap cannot be flooded at any time.

THIRD. There is an opening in the end of the Trap by which it can be connected direct to the waste pipe, so as to blow all sediment out from the bottom and this opening is also useful where the Trap is placed in a cold place likely to freeze if steam is turned off the heating apparatus, as by leaving the valve open the trap will drain dry, and prevent the Trap and pipes from freezing.

Report of the Board of the U. S. Naval Engineers.

CHIEF ENGINEER'S OFFICE, U. S. NAVY YARD, WASHINGTON.

January 26th, 1887.

SIR:

In obedience to your order of the 6th instant, appointing us as members of a board to carry out the instructions contained in a letter of the Bureau of Steam Engineering, dated the 5th inst., to examine and test a steam trap on the "Albatross," invented by P. A. Engineer G. W. Baird, U. S. N., and report, stating its advantages and disadvantages for Naval use, and whether it is recommended for purchase and use on Naval vessels.

We respectfully report that we have examined and tested the steam trap on the "Albatross," which is for the purpose of draining condensed water from the steam radiators and to prevent the escape of steam. It consists of a cast-iron chamber containing a spherical hollow float, a lever and a piston valve. The float is made of glass and is 6 inches outside diameter. The inventor does not confine himself to glass but claims the use of metal sphere for the same purpose. The piston valve and valve-chamber are of brass, and the valve has an opening of one-half of a square inch. The condensed water from the Radiators enters the Trap on top, and on rising to a given level in the trap lifts the float, and by the intervention of the lever opens the piston valve for the discharge of water in the trap, and on falling below the given level the float descends, closing the piston valve, and preventing the escape of steam. In addition to the automatic device there is an attachment for opening and closing the piston valve by hand. The accompanying drawing shows a longitudinal section of a trap.

The advantages are the employment of a piston valve perfectly balanced for discharge, certainty of action, small space occupied, cheapness, lightness, it is automatic, has a large opening for discharge, and can be shut off or blown through by means of the hand attachment on the Piston valve.

We recommend its purchase and use on Naval vessels.

Yours respectfully,

CHAS. E. DEVALIN Chief Engineer, U. S. N.

D. P. McCARTNEY, Chief Engineer, U. S. N.

R. R. LEITCH, P. A. Engineer, U. S. N.

CAPTAIN R. R. WALLACE, U. S. NAVY, Commandant.

SIZES.

No. 1,	Inlet and Outlet for 1 inch Pipe.
No. 2,	" " " 1 $\frac{1}{4}$ " "
No. 3,	" " " 1 $\frac{1}{2}$ " "

CAPACITY.

No. 1,	Drains, 5,000 feet of 1 inch Pipe.
No. 2,	" 8,000 " " 1 " "
No. 3,	" 20,000 " " 1 " "

PRICES.

No. 1 size,.....	\$35.00
No. 2 "	60.00
No. 3 "	75.00

All of the above sizes are made EXTRA HEAVY, and are calculated to work well from 1 lb. to 100 lbs. Steam Pressure at the Trap. Where heavier pressure is required, please state what pressure is wanted when ordering.

This Trap will be manufactured to work up to 160 lbs. or more at the trap, and the Trap to stand a test pressure of 240 lbs. For traps for this extra heavy pressure an additional charge will be made on each Trap.



WATSON'S

Steam Pressure Regulator.

Special Notice to Users of the Watson Pressure Regulator.

On new pipe always blow the pipe out well before putting the Regulator on. After a Regulator has been on a few weeks, take the plunger out and clean it well.

When boiler compound is used in the boilers, the plunger may need cleaning often. Never put a Regulator on pipes leading to the open air. It cannot work, because there must be enough back pressure to keep the plunger up or you cannot expect an even pressure on the reduced side of the Regulator. The waste or return pipes leading from a Regulator should always be trapped and not controlled by a globe valve, as no one can set the valve so as to keep an even pressure back of it.

If the returns from a regulator are carried into a tight tank or well, there must be no other return from a higher pressure carried into the same tank, trap or well, as the higher pressure will back up on the light side of Regulator and increase the pressure.

FOR ALL HEATING APPARATUS

use a Weight and Lever Pressure Regulator, unless the pressure is never required to be above 8 or 10 lbs., then use the kind with weights on top of the Plunger.

FOR PUMPS AND ENGINES,

or in any case where the pressure wanted is over 30 lbs. on the reduced side, use a Spring Pressure Regulator, see page 30.

FOR MARINE USE.

On all sea-going vessels a Spring Regulator should be used, no matter what the pressure is required on the reduced side—these should always be ordered specially, as none are carried in agent's stock, only state what they are to be used for and about what pressure is wanted on the reduced side.

FOR LIVE AND EXHAUST STEAM

where a Pressure Regulator is wanted to mix live and exhaust steam, the Regulator must be put on at a point so high that the exhaust steam cannot come back on the Regulator, as the sediment in the exhaust will cause the plunger in the Regulator to stick. But a swinging check valve can be used on the live steam pipe to prevent the EXHAUST FROM COMING BACK.

FOR REGULATING WATER PRESSURE.

There is no better Water Regulator than the Watson Pressure Regulator with Spring Attachment, when used in connection with our Relief Valve, which is used to carry off the leakage from around the plunger and prevent accumulation of pressure on the reduced side. In ordering for water always state in the order as these Regulators are made differently for that purpose.

FOR AIR.

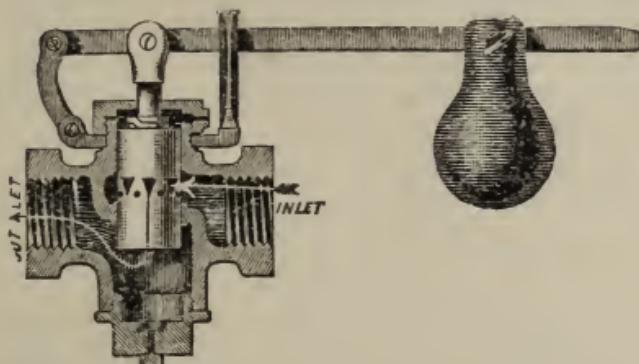
Our Pressure Regulator has been successfully used to regulate air pressure, for which purpose they must be ordered and made expressly for that purpose.

FOR HEATING CARS.

Where steam is used for heating cars by steam taken from the locomotive boiler, we make a Regulator with a Spring that will regulate to the required pressure. But it must be ordered specially for that purpose.

WATSON'S
PATENT

Pressure Regulator.



Use nothing but OIL in making Joints to this Valve; LEAD must not be used about it. After it is attached, it lubricates only with Steam. Never oil it anywhere.

Adopted by the United States Government.

**FOR STEAM HEATING WORK USE WEIGHT
AND LEVER PATTERN.**

We would call your special attention to our improved Pressure Regulator, for reducing and keeping at a uniform pressure the steam in drying cylinders, evaporating pans, steam heating, etc.

By the use of this Regulator the steam, while at a high pressure may be brought directly to the cylinder; here, in passing through the Regulator, the pressure is cut down to the required amount. For instance:

A drying cylinder requires a pressure of say 8 pounds to dry so much per hour, but the boilers must carry 70 to 80 pounds to drive the engine; how can we get clear of this excess of pressure without waste? The

Regulator will do this simply by moving the weight until the gauge indicates the 8 pounds pressure. Once set, no further attention is required, but it will quietly regulate itself to the pressure in the boilers, no matter how it may vary; provided, of course, it is always above the required 8 pounds.

The Regulator should be used on every steam pump, as it can be set so as to give the pump an even pressure of steam, no matter how great the boiler variations may be, and insure its running at any required speed, thereby requiring but little attention after starting. We make special Valves for Pumps at regular prices.

Each Valve is made full area of the pipe it goes on, and the body of all valves so constructed as to avoid twisting out of shape, which has heretofore been an objection to them and all Regulators in the market.

When valves are put in new work, and become charged with sediment or lead from the pipes, take the plunger out, clean it nicely with emery cloth (only fine cloth should be used), and take care not to reduce the plunger enough to make the valve leak.

In setting these valves, great care should be taken that the pipes cannot spring them. A hanger should be arranged on each side of the valve to keep the weight of the pipes off it. Flanged valves require more care than screwed ones. If, after the valve is in position, it is not free and easy, loosen one flange entirely, and it will then be found if bolting up the flange has sprung the valve. Practical men will easily understand the remedy in such cases. Flanges used to connect these valves should always be turned true.

All valves of three inches and upwards are now made with heavy iron bodies and brass lined, and cannot get out of order.

This is the only Regulator in the market that reduces pressure and gives full area to the pipes.

A great advantage we claim for this Regulator over all others is that it has no **Gum or Packing**, and therefore no danger of getting out of order. We claim the following advantages for this Regulator over all others.

- 1st. It is Metal throughout all its parts.
- 2d. It has no Gum or other Diaphragm to blow out.
- 3d. It requires no packing.

In all deep mining operations, where pumps or engines are down in the mine and the boiler at the ground surface, this Regulator can be used to great advantage; because, no matter what variations may occur in the boiler pressure, by using the Regulator near the boiler and on the pipe leading to the pump or engine, you can have a regular pressure at your work by setting it to the number of pounds pressure wanted; thus avoiding frequent visits of engineer down to the pump or engine.

PRICES.

Brass Regulators which are made Screwed Ends Only.

Three Quarter Inch	\$ 14.00
One Inch,.....	17.00
One and a Quarter Inches,.....	22.00
One and a Half Inches,.....	28.00
Two Inches,.....	38 00
Two and a Half Inches,	55.00
Three Inches,	70.00
Four "	90 00

Iron Bodies, Brass Lined Screwed Ends Only.

Two Inches,.....	\$ 38.00
Two and a Half Inches,	55.00

Iron Body and Brass Lined, made with Flanges also tapped for screwing and can be used either way.

Three Inches.....	\$ 70 00
Four Inches.....	90.00
Five Inches.....	110.00
Six Inches.....	150.00
Seven Inches	180.00
Eight Inches.....	210.00

In ordering Regulator, if possible, state boiler pressure, and something near the pressure used on the light side, also the use to which you intend to apply the Regulator.

FOR STEAM HEATING, where the boiler is run at a high pressure for power, this Regulator can be attached to the heating pipes, and the pressure reduced to 5 or 10 or more pounds, as required, preventing the danger of bursting the radiators; and in warm weather the pressure can be reduced accordingly.

All buildings running an elevator and heating apparatus from the same boiler, should use the Pressure Regulator in the mild weather of early winter or late spring. When a few pounds of steam is only required for heating purposes, the Regulator can be set at low pressure and boilers carry steam sufficient to run the elevator or other machinery. It is of great advantage at night, when only a little steam is required to keep the building warm, as it can be set by the engineer on leaving the building, and need not be interfered with by the watchman during the night; it *will* regulate itself.

TO PAPER MANUFACTURERS.

This Regulator has been used by many of the largest paper manufacturers in the country as a Regulator to Rotary Bleaches, and in every case where tried, it has been adopted. We will fill orders for trial, and guarantee the Regulator superior to all others in the market for that purpose.

THE JESSUP & MOORE PAPER CO.
AUGUSTINE MILLS,

WILMINGTON, DEL., July 27th. 1886.

Gents:—Yours of the 26th to hand and contents noted, you may say we have had your Pressure Regulators in use for the last 10 or 12 years at least, on our Rotary Boilers and like them very much, they cause no trouble and do the work well and are the best we have ever used.

Yours respectfully, D. LINDSAY.

WAITS RIVER PAPER CO.

BRADFORD, VERMONT, Feb. 1st, 1888.

Gents:—Herewith we hand you our check for \$28 in settlement for a one and a half inch Pressure Regulator. We have given the Regulator a just trial and pronounce it the best thing we have seen for the purpose, we would not be without it knowing its merits as we do.

Yours truly,

A. F. COLBURN, *Treas.*

TO BREWERS.

These Pressure Regulators should be on all brewers' kettles, as by the use of them a regular pressure can be had, and when the beer commences to boil it can be kept boiling steadily, and no fear of boiling over of the kettle. Brewers who have them in use say they save more beer every month, by preventing the kettle from boiling over, than will pay for the Regulator. The service of a man, who is generally kept to watch kettles when boiling, can be saved, as all that is to be done is to set the valve at the pressure desired to boil steadily, and let it alone until the brewing is finished.

A Trap sufficiently large should always be used to carry off condensation and prevent backing up.

To Packers, Lard Renderers, Oil Mills, Distilleries, &c.

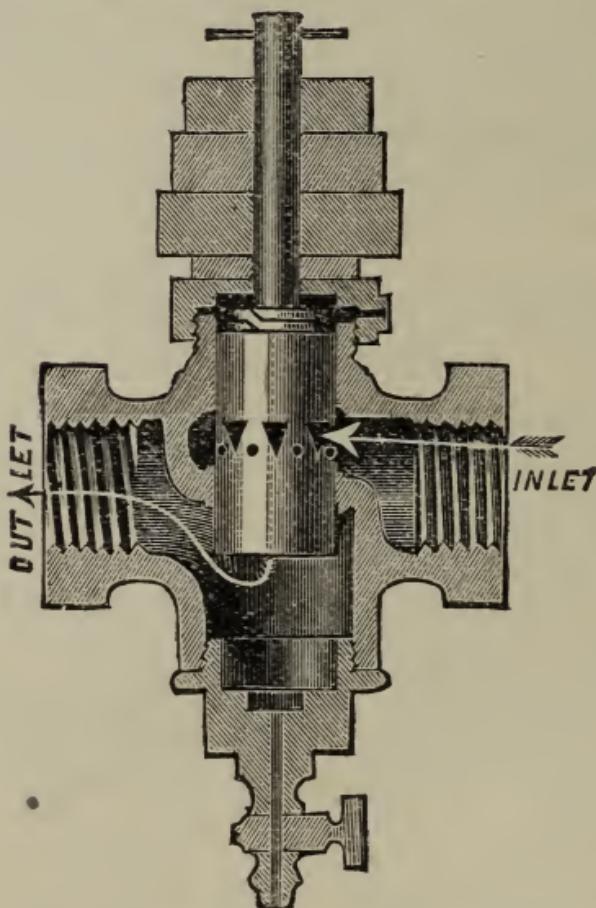
The Regulator should be used on all lard kettles as by a steady and even pressure on the kettles there is no danger of burning it; and in most cases where pork packers render lard by steam from pipes leading from the same boiler that runs other machinery, there is more pressure than is necessary to boil with, and the consequence is a steady blowing off at the safety valves on the kettles. By the use of the Regulator a steady boil can be kept up until the lard is done, without fear of boiling over or burning. This can be done by setting the Regulator at say a pound less Pressure than the safety valve on the kettle is set at, and there will be no waste of steam at safety valve. The same results can be obtained on oil, alcohol and liquor stills, and in fact, in all cases where a steady pressure is required to heat, boil, or dry by steam. We will furnish, when ordered, a good, reliable Gauge at a price as low of can be purchased

WATSON'S

PATENT

PRESSURE REGULATOR WEIGHTED.

Adapted for Low Pressure Work
from 1 to 10 Pounds.



The above cut represents our Pressure Regulators, adapted specially for dryers in Paper Mills, Slashers in Factories, Cylinders in Print Works, etc., and all places

where a very accurate and low Pressure is required, particularly that class of cylinders which are not intended for much pressure.

It will be seen at once that the weights are applied directly on top of the piston, thereby doing away with either spiral spring or weight or lever.

This Regulator is to be used only on such places where a pressure is desired of from only 1 to 10 pounds. State in ordering, what is the highest and lowest pressure wanted.

It is well adapted to that class of Radiators, used in Steam Heating, not made to stand heavy pressure, as it will not admit any pressure in excess of that to which it is weighted. Also well suited to regulate steam going to Cooking Apparatus, Steam Tables and Heating Urns.

—:o:—

WITH EXHAUST STEAM.

When used in connection with Exhaust Steam, this Regulator can be set at a very low pressure—thereby supplying steam direct from the boiler—and making up any deficiency in the exhaust used for heating purposes; also when the exhaust is entirely cut off, this Regulator will supply what steam is necessary for heating without any further regulating.

PRICES.

Three Quarter Inch	\$14.00
One Inch	17.00
One and a Quarter Inches.....	22.00
One and a half inches.....	28.00
Two Inches.....	38.00

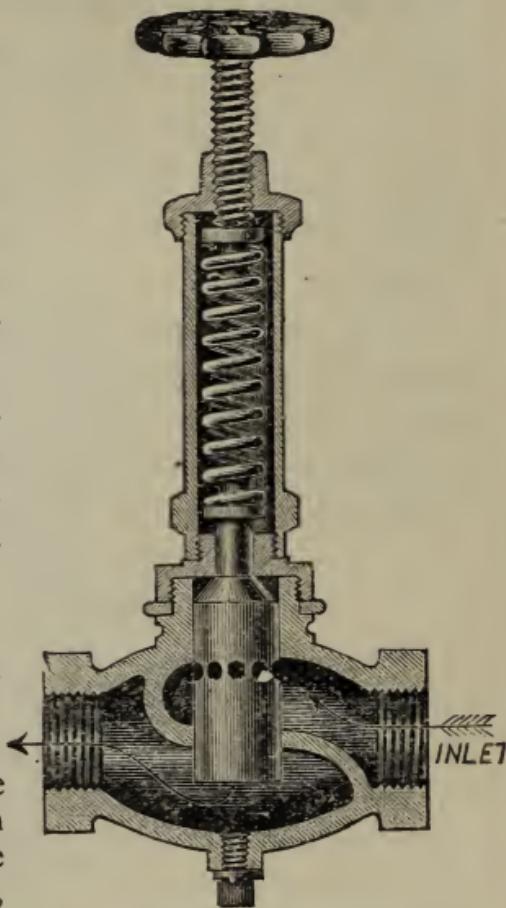
Spring Pressure Regulator

For Steam Pumps, Engines, Steam Vessels. &c.

For **EXTRA HIGH PRESSURES**, say for pressures wanted above 30 pounds on the light side, or where used on steam pipes leading to **STEAM PUMPS** or **ENGINES**, or Automatic Sprinklers, Ice Machines and in all cases where a little swinging of the weight and lever would be objectionable

FOR STEAM PUMPS and ENGINES.

A Globe Valve must be used on the light side in addition to the Throttle Valve at Pump or Engine, which must be kept closed enough to make a steady back pressure on the Regulator, so as to prevent the plunger from dancing. It is desirable that this Globe Valve be placed near the Throttle Valve; and when once set it should not be interfered with or changed, and set the Regulator as far from the Pump or Engine as the Steam Pipe will allow, so as to give space between the Regulator and Pump or Engine, to allow it to work smoothly.



In ordering Regulators to be used on Steam Pumps or Engines, state it so in your order; give the probable pressure wanted on the light side.

FOR STEAMSHIPS AND CARS.

We make a Regulator with a lighter Spring which is indispensable for Heating Steamships or Cars from Locomotives, as the rolling of the vessel or the motion of the cars do not affect the Regulator. Can also be used to great advantage by Elevated and other Railroad Companies, heating cars by steam.

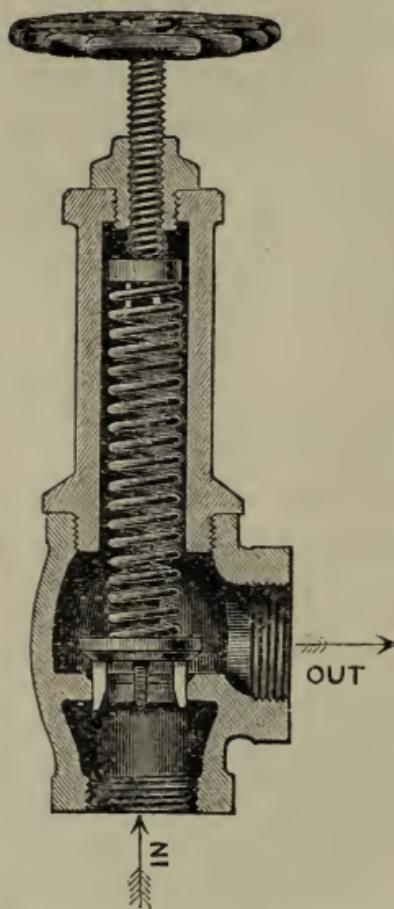
PRICES.

Three Quarters Inch.....		\$14.00
One Inch.....		17 00
One and $\frac{1}{2}$ Quarter Inches		22.00
One and a Half Inches .		28.00
Two Inches.....		38.00
Two and a Half Inches..		55.00
Three Inches		70.00
Four "		90.00
Two Inches.....	Brass Regulators which are made Screwed Ends only	\$38.00
Two and a Half Inches.		55.00
Three Inches		\$70.00
Four Inches.....		90.00
Five Inches	Iron Bodies, Brass lined Screwed Ends only	110.00
Six Inches.....		175.00
Seven Inches		200.00
Eight Inches		230,00

RELIEF VALVE.

ON WATER PIPES

To be used in connection with the Watson Pressure Regulator when used for reducing water pressure, where it acts as a Safety Valve to prevent an accumulation of pressure on the light side, so that the pressure on the pipes can never rise above what it is set at by the Pressure Regulator, and when no water is being used. The natural leakage, which occurs in all Pressure Regulators, is thus provided for, the leakage being passed off through a pipe from the Relief Valve back to a tank or waste pipe or to any place desired. This prevents any accident to the pipes in the night, or in the day, when water is not in actual use. In fact it is the only reliable safety that can be had where water pressure has been reduced, as it acts in that case as a Safety Valve.



WHERE HOSE is used in buildings for protection from fire, the Relief Valve should be put on in connection with our Pressure Regulator, as it insures safety when the hose becomes kinked, or is shut off at the nozzle, by letting the extra pressure run back to a tank or waste at any place desired; and when the hose is straightened again, or the nozzle opened, it acts automatically, and the water again flows through the hose as soon as the obstacle has been removed, thereby securing safety under all circumstances.

For Dwelling Houses, Factories, &c.

Where there is a heavy water pressure on the main, our RELIEF VALVE can be used with a pressure Regulator, as all water in excess of what the Relief Valve and Regulator is set at can be wasted into a tank or drain, so that it would be impossible for an increase of pressure on the main, occurring during the night, or at any other time, to cause the lead pipe to burst. The Relief Valve can be set to stand just what pressure is wanted on the lead pipes and no more, also stopping all noise and water hammering.

For Buildings Heated by Exhaust Steam.

The exhaust steam can be collected in a tank and the Relief Valve placed on top of the tank, so as to run the steam discharge from the Relief Valve to the Exhaust Pipe from the engine, setting the Relief Valve at the amount of back pressure that can be carried on the engine, and the exhaust steam thus collected in the tank can be forced through the heating pipes used for heating the building. It can be seen at once that by taking the exhaust from the top of the tank that dry steam can thus be obtained by tapping the tank at the bottom and using a steam trap, so that all the water can be carried off before the exhaust steam enters the heating apparatus.

The above arrangement can easily be made, in all cases, by running all the exhaust from the building into the tank, when wanted for heating, direct from the engine and by having a connection to the regular exhaust pipe to be used when the exhaust is not utilized.

For Steam in connection with a Pressure Regulator.

THE RELIEF VALVE is also used on the light side of a Steam Pressure Regulator placed on Pumps or Engines, or in cases where a great accuracy in controlling the Steam Pressure is necessary, as in case the Pressure Regulator should get out of order or stick, or the weight or

spring be moved by a meddlesome person, then the Relief Valve will let off steam in excess of what is wanted, and it can be blown off in the air or piped away to some point where it can be used.

When the RELIEF VALVE is used on steam, set it say 1 lb. more than the Steam Pressure Regulator is set at and no steam will be wasted or blown out only in case the Regulator should stick which seldom happens.

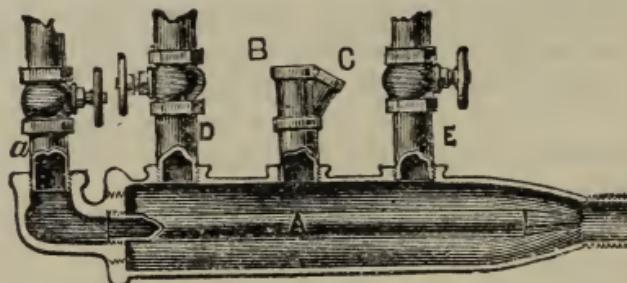
PRICES.

Half Inch	\$ 6 00
Three quarter Inch.....	8.00
One Inch.....	10.00
One and a quarter Inches.....	12.00
One and a half Inches.....	14 00
Two Inches	18.00
Two and a half inches	24 00

Something Entirely New and Useful to all Steam Users.
Stops all Noise in Radiators or other Heating Apparatus.

McDANIEL'S PATENT SUCTION FITTING

[PATENTED JANUARY 27th, 1885.]



A. Represents the feed or suction pipe, working the Fitting and creating the vacuum.
a. Is the steam pipe from coil getting steam nearest the boilers, it supplies the steam to work the fitting, and create the vacuum, and should always be the best and strongest coil or coils, or radiators, and have as dry steam as possible, also one that will be in constant use.

B. and **C.** Represent, say one floor of a building, and water pipes leading from it, no matter how many, they can be collected to come into the Fitting at one point.

D. and **E.** Can be used for sucking the condensation from other floors or different parts of the building, all coils being connected so as to have a fall into the Fitting.

The attention of all Steam Fitters, also of all parties who have buildings already heated by steam, is called to our Patent Suction Fitting. By using the same you increase the circulation and get from fifteen to twenty degrees more heat with the same quantity of steam than you could without it.

It does away with the snapping and cracking noises in the pipes.

It is used either in connection with a Steam Trap or without it. When used with a Steam Trap it acts by sucking all the water of condensation of the pipes and forcing it into the Trap.

It is also of great benefit on Heating Apparatus where the condensation is returned to the boilers,

By using the radiator or coils that get the steam first from the main steam pipes, it acts as a forcing power to work the Suction Fitting, you utilize the steam already used for heating purposes to force circulation, create a vacuum, and increase the heat, also prevent all noises in the pipes.

By a careful examination of the cut, any engineer or person acquainted with steam heating will see at once how to apply it, and it will in all cases show the great advantage we claim for it.

When a building is already piped to return condensation to the boilers, the returns must all be connected so as to come into the Suction Fitting, and the strongest or the one first getting the steam is used to work the fitting.

Where condensation is returned direct to the boilers, a check valve should be used between the Suction Fitting and the boiler.

Where steam is used in drying rooms we have increased the heat so much, without any extra use of steam that the result was plain from the first hour it was put on,

as will be seen from testimonials from well-known parties who have it in use.

It can be set either vertical or horizontal, only have as few turns between the Fitting and Steam Trap or boiler as possible, setting the Fitting four feet or more from the Trap where it can be done, or at some point where all the returns can be brought into the Fitting, no matter how far distance from the Trap or boiler.

For Heating or Drying by Exhaust Steam

The Suction Fitting, also our Suction Tee, can be used to advantage where exhaust steam is used either for heating purposes or in a dry room, by connecting the waste pipe from the exhaust steam to the Suction Fitting at **D**, or to the Suction Tee at **A**, and using the waste from some point where live steam has been used for heating or other purposes, at **A** on the Suction Fitting, or at **B** on the Suction Tee. The Suction created will draw the exhaust steam through the pipes and relieve the back pressure on the Engine. Use at least a length of pipe at outlet so as to insure perfect suction.

PRICES.

No. 1. 1 $\frac{1}{4}$ inch Outlet, 1 inch Drain Pipes, and 3 $\frac{1}{4}$ inch for Suction or Feed Pipe.....	\$10.00
No. 2. 1 $\frac{1}{2}$ inch Outlet, 1 $\frac{1}{4}$ inch Drain Pipe, and 1 inch for Suction or Feed Pipe.....	12.00
No. 3. 2 inch Outlet, 1 $\frac{1}{2}$ inch Drain Pipe, and 1 $\frac{1}{4}$ inch for Suction or Feed Pipes.....	15.00

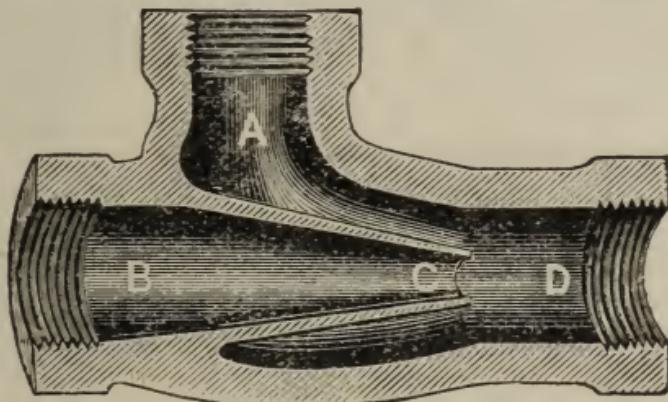


Stops one Steam Connection from backing up on another, and prevents all noise.

McDANIEL'S PATENT SUCTION TEE.

PATENTED JANUARY 27th, 1885.

This is a Fitting that will make all bad jobs of Steam Heating work well and stop the snapping and backing up of one Return on another.



The Suction Tee can be used in all cases where a common Tee is now used, either as a Tee on the main waste, or set above or directly on top of the main waste. Where reducing the main is an objection, set the Suction Tee above and use a close nipple and ell, and let it stand directly on top and over the main waste, connecting a number of radiators or coils at **B** to work the Suction and the other radiators or coils at **A**, by which means you use part of the coils that do work well to suck the condensation out of those that do not circulate freely.

In places where the Suction Tee suits best put it in as a part of the main waste or return, it will be found that what reduction there is made in the main waste or return is made up by a greater velocity gained by the peculiar construction of the Tee, as it works with the

Wherever two returns back up on another, it will stop the same—by using the shortest one, getting its steam first, at **B**, and the other and weaker one at **A**; as by

this means the stronger one will act as an ejector and cause the weaker one to circulate freely. All can then be connected at **D**, and carried on to the main waste or return.

The Suction Tee can be used to advantage in making all connections on heating jobs, where condensation returns to the boilers, put it on wherever two returns come together.

It is required wherever two or more connections are made to the same Steam Trap, as it will cause all the condensation to flow freely into the Trap and avoid the trouble of one backing up on another, and one Steam Trap can be made to answer for several different connections, avoiding the necessity of putting a Steam Trap to each return, if all are from the same boiler.

ON DRY ROOMS FOR KILNS.

where the pipes are in different sections, one section can be used to make the other circulate, and all leakage of the pipes stopped and an increase and uniformity of heat obtained.

No extra or live steam need be used to gain the above advantages claimed for this Tee, as it is worked by the steam after it has been used through other coils than the one it draws.

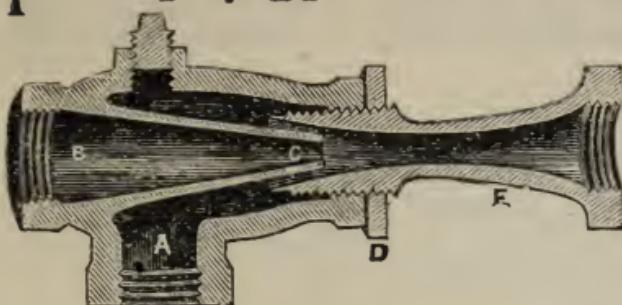
The advantages of the Suction Tee can be seen at once by any practical man, and the cost of all is so small that it will pay any steam user to adopt it at once, as it can be substituted in place of a common Tee by any fireman or engineer.

PRICES.

One Inch.....	\$1.00
One and a Quarter Inches.....	1.25
One and a Half Inches.....	1.50
Two Inches.....	2.00
Two and a Half Inches.....	2.50

Although we do not make a smaller size than a **1 inch** Suction Tee we have frequently orders for smaller. In order to fill such orders we are now making a Tee with the **Cone reduced at C** to $\frac{1}{4}$ of an inch, so that parties can reduce this 1 inch Tee with a reduced Cone at the different opening to suit themselves and work as smaller sizes. Where small Cone Tees are required, state in order. Also what use they are wanted for.

Mc DANIEL'S Patent Syphon or Water Lifter



Description of Cut

- A. Suction Pipe.
- B. Steam Connection
- C. End of Cone or Steam Delivery.
- D. Jam Nut.
- E. Adjustable Brass Nozzle.

This is the best and cheapest substitute for a Steam Pump that is manufactured. It will lift water fifteen feet with any ordinary Steam pressure.

It is economical in the use of steam, and discharges a full pipe of water when in operation—when it is once set according to the directions—and requires no attention whatever.

Should be used on all Steam Ships and places where Tanks, Vats, or Pits are to be pumped out or filled.

PRICES.

No. 1—Suction and Discharge, 1	inch.....	\$ 6.00
" 2—	" " "	1 1/4 "
" 3—	" " "	1 1/2 "
" 4—	" " "	2 "
" 5—	" " "	2 1/2 "

SIZES OF STEAM DELIVERY AT CONE.

I	In.— $\frac{1}{4}$ In.	$\frac{1}{4}$ In.—5-16 In.	$\frac{1}{2}$ In.—7-16 In.
	2 Inch—9 16 Inch.		2 1/2 Inch—11-16 Inch.

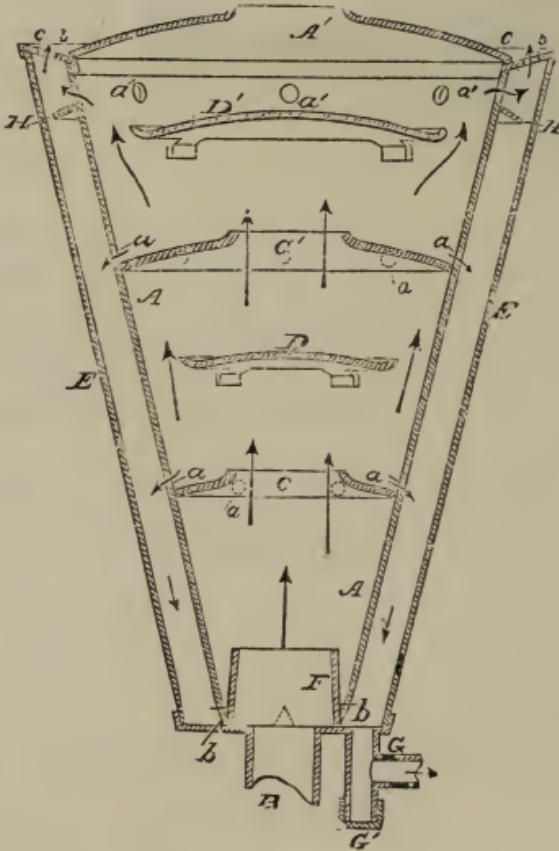
DIRECTIONS FOR SETTING.

Screw the nozzle into the iron body so as to suit the steam pressure and height you wish to raise the water and then screw the discharge pipe into nozzle of the shoulder, so as not to make a break in the water; and after it is once set and working, screw the jam nut up tight to the body.

It is necessary to have all connections air tight. Lift the water in all cases without forcing if possible, using bent pipe instead of fittings in making turns, so as to prevent all abrupt turns and lessen friction. In starting, blow out the pipe, so that dry steam can be had at the lifter; then shut off steam for a moment, after which turn it on again until the syphon works, using as little steam as possible.

**McDANIEL'S
PATENT
CONDENSER + HEAD.**

NO WATER ON ROOF OR SIDEWALK.



SECTIONAL VIEW.

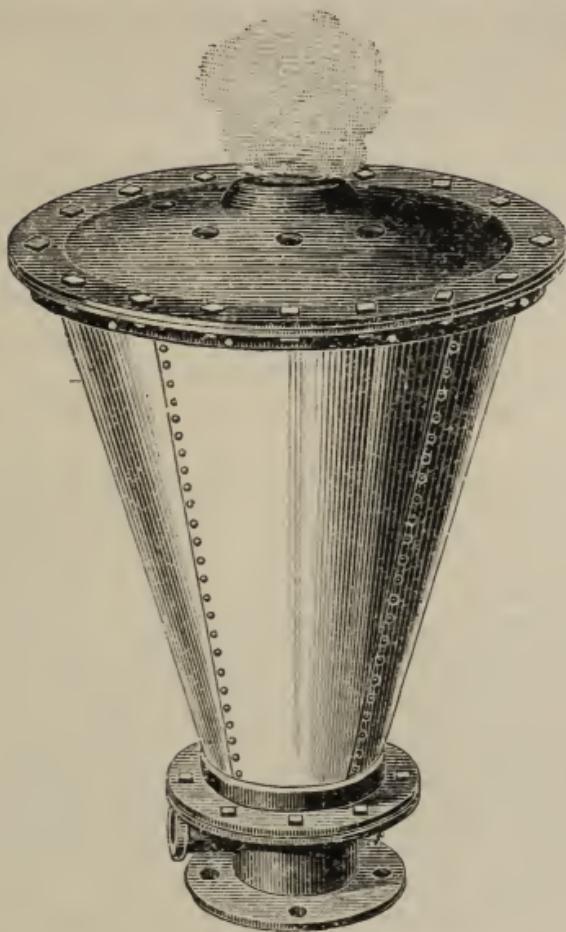
FOR EXHAUST STEAM PIPES.

Should be used on all Establishments using Steam.

[Patented August 18th, 1874, June 21st, 1881.]

McDANIEL'S EXHAUST PIPE HEAD.

—NO BACK PRESSURE.—



NO WATER ON ROOF OR SIDEWALK.

FIG 2, OUTSIDE VIEW.

This Head can be used on all exhaust pipes, as it keeps the roof perfectly dry, and prevents the accumulation of ice, and avoids spattering of pavements and buildings with water. It is especially useful at **Blast Furnaces, Stationary and Elevator Engines** **Buildings on Main Streets, Steam Pumps,** **Steamships, Steamboats, Pleasure Yachts,** **Breweries and Manufactories.**

When the Condenser Head is placed on an exhaust pipe leading through the roof, hot water can be obtained on the different floors for washing or mechanical purposes, by placing a barrel or tank on each, and having an overflow from one to the other.

Also, where returned direct to boiler or tank room, by pumping from the bottom of the tank—thus avoiding floating grease—the hot water can be used again in the boiler, which alone will soon pay the cost of the Head.

Also, on steamboats it is useful to prevent spattering of water and ink on the decks.

The double case form of our Condenser Head can be seen at once to give us a great advantage over all others, in increase surface for condensation.

Every Head sent out is guaranteed to work satisfactorily.

They can be attached by any workman or engineer.

Care should be used in connecting the drip or return pipe, as it should not be made fast to the Head, as the expansion of the exhaust pipe would have a tendency to draw the Condenser Head to one side. In making that connection have the drip Pipe where it connects to the Head, large enough to slip over the nipple, which is connected to the bottom of the same, thus forming an expansion or slip joint, between which should be packed with waste to prevent steam from coming out between them. Should grease or sediment collect inside the Head, the plug on the opposite side from where the drip pipe is connected can be unscrewed and the deposit removed.

The Heads are also put together with bolts, and can be easily taken apart to cleanse or repair.

A trial of this Exhaust Head is all that is required, as they all work perfectly.

In putting up an Exhaust Head the drip or waste pipe *must* have a continuous *fall* from the Head to the outlet. There must be no traps in it, as there must be a space to allow air to go into the Exhaust Head while the water condensation is passing off, and there must not be any other connections coming into the discharge pipe

from an Exhaust Head or it will not work at all. Never reduce the outlet for waste pipe.

LIST OF PRICES AND SIZES OF "McDANIEL'S EXHAUST PIPE HEADS."

SCREWED.

Sizes for 2 inch Iron Pipe	\$ 25.00
" 2½ "	27.50
" 3 "	30.00
" 3½ "	35.00
" 4 "	40 00

FLANGED.

" 5 "	50.00
" 6 "	60.00
" 7 "	70.00
" 8 "	85.00
" 10 "	120.00
" 12 "	150.00

Sizes Made up to 24 inches.

TESTIMONIALS.

THE EDISON ELECTRIC ILLUMINATING CO.

CUMBERLAND, MD., March 17th, 1885.

Gents:—Your eight-inch Exhaust Pipe Head is doing all right, it effectually drains the water and gives satisfaction in every way.

J. B. G. ROBERTS, *Treas & Gen'l Manager.*

PHILADELPHIA, September 22d, 1884.

Gents:—Referring to the six-inch Exhaust Pipe Head you put on our engines at the *International Electric Exhibition*, I would say: I have indicated the engines and find no back pressure whatever. We would cheerfully recommend it to all users of Steam Engines who are annoyed by the throwing of greasy water.

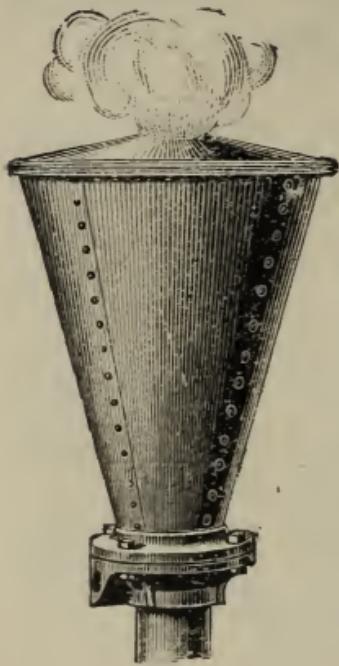
Very respectfully yours,
P. J. FICKINGER, *Straight Line Engine Co.*

PHILADELPHIA, November 25th, 1884.

Gents:—Enclosed we send you check for Exhaust Pipe Head, we have never Paid for anything more willingly, as it has proven more than satisfactory, and we wish we had known it before, as it has supplied a long felt want in our establishment. Yours truly,

A. B. RICHARDS, *Nonpareil Laundry, 680 N. Broad St.*

Keystone Exhaust Pipe Head.



We are also manufacturing our patented Keystone Head to supply the demand for a cheaper article at the following low prices which is as low as a Pipe Head can be made to be reliable, it works well, is made without the cast iron top and is made up to 10 inches and sold at the following

LOW PRICES.

For 2 inch Iron Pipe, \$14.00	For 3 1/2 inch Iron Pipe, \$21.00
" 2 1/2 " " " 16.00	" 4 " " " 24.00
" 3 " " " 18.00	" 5 " " " 30.00

The above sizes are made to screw on pipe only, Nipples and Flanges when ordered will be furnished, for which an extra charge will be made.

FLANGED ONLY.

For 6 inch Iron Pipe, \$36.00	For 8 inch Iron Pipe, \$50.00
" 7 " " " 43.00	" 10 " " " 85.00

COPY OF REPORT

—OF—

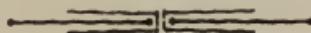
BOARD OF UNITED STATES
NAVAL ENGINEERS

—ON—

PATENTED STEAM SPECIALTIES,

—MADE BY—

Watson & McDaniel.



On August 11th, 1886, we wrote to Charles H. Loring, Chief of Bureau Steam Engineering, Navy Department, Washington, D. C., requesting that a test be made of our goods, with a view of introducing them in the U. S. Navy, which request was kindly granted, and Chief Engineer ROBERT POTTS, and Chief Engineer HENRY D. McEWAN were appointed as a board to make the test, which was commenced on September 6th, and ended September 9th.

Philadelphia, Pa., September 16th, 1886.

To COMMODORE CHAS. H. LORING,

Chief of Bureau of Steam Engineering, U. S. Navy.

In conformity with the Bureau's instruction, dated 13th ultimo, we have examined and practically tested the **Suction Tee, pressure Regulator and Steam Trap**, made by MESSRS. WATSON & McDANIEL., of Philadelphia, Pa.

WITH THE FOLLOWING RESULTS.

The practical tests made by the undersigned with the above named devices, especially those made on the 8th and 9th instants, demonstrates the following results: That the **Suction Tee** is decidedly superior to the ordinary Tee in draining radiators placed on the same, or different levels when the discharges are connected to a single pipe before entering the Trap. On the 9th inst., when the drain pipes were connected with the ordinary Tee, No. 2 radiator could not be drained while the others were in operation, and No. 3 showed water at different times, although it was placed much higher than the Trap. The cracking and snapping noise in radiators was very considerable, and lasted for some time when steam was turned on to expell the cold water: but under the same conditions, the radiators were comparatively noiseless when the drains were connected with Suction Tees. In connecting the drain pipes of radiators in buildings or on ship-board, a **Suction Tee** should be used where two drain pipes connect.

PRESSURE REGULATOR.

The **Pressure Regulator** is simple in construction, does not require any kind of packing, and when set will indicate almost a steady pressure, without regard to variations in the initial, or boiler pressure. It is an admirable arrangement for reducing pressure where the work is nearly uniform, as it can be set at any point from five pounds upwards; but where the work is periodical, as that done by pumps, or small engines, it would be necessary to have a stop valve to shut the steam off, or a small waste pipe on the light side to carry off the leakage from valve.

CHAPMAN'S STEAM TRAP.

The **Steam Trap** discharges no steam, even under the highest pressure, as the flat float allows a depth of about six inches of water over valve before the discharge takes place. It can be cleaned, or any of the pieces renewed, with facility.

RECOMMENDATION BY THE BOARD.

We would recommend that the **Suction Tee** and **Steam Trap** be used on all naval vessels that are heated by steam, as we consider them superior to anything of the kind now in use. On naval vessels using high pressure steam, we would recommend the **Pressure Regulator** for reducing the pressure on the heating apparatus, and it would prove advantageous if attached to the pipes leading to the pumps and small engines, where high pressure is not required.

We are respectfully your Obedient Servants,

ROBERT POTTS,

Chief Engineer U. S. N.

HENRY D. W. McEWAN,

Chief Engineer U. S. N

Engineer in Chief

CHAS. H. LORING, U. S. N.

Chief of Bureau of Steam Engineering,
Washington, D. C.

U. S. GOVERNMENT STEAM TRAP REPORT

NAVY DEPARTMENT.

BUREAU OF STEAM ENGINEERING.

NEW YORK NAVY YARD,

March 11th, 1879.

S:R:—

In conformity with the Bureau's instructions, the undersigned have examined and practically tested the "Improvement in Steam Traps," for which Letters Patent numbered 202,520 and dated April 17th, 1878, were granted to Joseph L. Chapman, of Philadelphia, Pennsylvania.

The mechanical arrangement of this steam trap is shown in the accompanying drawing; it is simple, compact, durable and cheap, and the apparatus can be quickly and easily taken apart for examination or cleaning.

During the practical test of this steam trap made by the undersigned in the machine shop of the New York Navy Yard, its action was entirely satisfactory.

It discharged the water of steam condensation promptly, without blowing off steam or making any noise. It is well designed and well made, and will properly perform all the functions that can be required of any steam trap.

Very respectfully,

[SIGNED] B. F. ISHERWOOD, *Ch. Eng., U. S. N.*

THEO. ZELLER, " "

ROBERT DANBY, " "

W. H. SHOCK, *U. S. NAVY,*

Engineer-in-Chief.
Chief of Bureau of Steam Engineering, Navy Department.

ESTABLISHED 1878.

We Manufacture and offer to the trade

CHAPMAN'S STEAM TRAP.

BAIRD'S AUTOMATIC STEAM TRAP.

McDANIEL'S SPECIAL STEAM TRAP—
except No. O and No. OO.

No. O, McDANIEL SPECIAL STEAM TRAP,
No. OO, McDANIEL " STEAM TRAP.

MARINE STEAM TRAP.

WATSON'S STEAM PRESSURE REGULATOR
Weight and Lever.

WATSON'S STEAM PRESSURE REGULATOR
weight on Top.

WATSON'S STEAM PRESSURE REGULATOR
with Spring for Pumps.

WATSON'S STEAM PRESSURE REGULATOR
Railroad Car Heating.

McDANIEL'S EXHAUST PIPE HEAD.

KEYSTONE " " "

McDANIEL'S SUCTION FITTING.

" " TEE.

McDANIEL'S EJECTORS or WATER LIFTER
RELIEF VALVES, &c., &c,

ABOUT EXHAUST PIPE HEADS.

Remember the **McDaniel Exhaust Pipe Head**, although not the lowest in price it is the Best in the world. It has a **double Case** and is in fact **Two Heads in One**.

It is the **only Double Cased Head** that is made in the United States.

It is the greatest condenser of Exhaust Steam, catches every drop of the water and is a great check on the noise.

It has a Cast Iron Top and Bottom, the Top is bolted to a ring and can be easily taken apart and repaired.

THE KEYSTONE EXHAUST PIPE HEAD.

It is the lowest in price of any Head on the market, it works well and is reliable and fully as good as all other Single Case Heads.

It is made Single Case, with Cast Iron Bottom and Galvanized Sheet Iron Top made permanent.

It will do as good work as any other Head except the **McDaniel**.

